هيئة الإمارات للمواصفات والمقاييس

Emirates Authority For Standardization & Metrology (ESMA)

المواصفة القياسية الإلزامية

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المتطلبات الفنية لأجهزة إستقبال البث الرقمي الأرضي في دولة الإمارات العربية المتحده

Receiver Specification Requirements for Digital Terrestrial TV Broadcasting in UAE

Draft project

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إعداد

هيئة تنظيم قطاع الإتصالات

هذه الوثيقة مشروع مواصفة قياسية إلزامية إماراتية تم توزيعها لابداء الرأي والملحوظات بشأنها، لذلك فأنها عرضة للتغيير والتبديل، ولا يجوز الرجوع اليهاكمواصفة قياسية خليجية الا بعد اعتمادها من الهيئة.

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وقد قامت هيئة تنظيم قطاع الإتصالات عن طريق فريق عمل فني قام المجلس بتشكيله بإعداد مسودة المواصفة القياسية الإلزامية الإماراتية الخاصة :
المتطلبات الفنية لأجهزة إستقبال البث الرقمي الأرضي في دولة الإمارات العربية
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وقد اعتمدت هذه المواصفة كلائحة فنية إماراتية مع إدخال تعديلات /بدون إدخال أية تعديلات فنية عليها وذلك في اجتماع مجلس إدارة الهيئة رقم ( ) ، الذي عقد بتاريخ / / هـ ، الموافق / / م.

Foreword

Emirates Authority for Standardization &Metrology is the national body, one of its main functions is formulating and issuance standards and technical regulations of UAE as well as adopting international standards in all sectors.
TRA through the working group formed by it has prepared the draft of receiver specification requirements for digital terrestrial TV broadcasting in UAE.
This standard has been approved as a UAE technical regulation with/without any modifications by ESMA board in its meeting No. ( ), held on / / H, / / G.

1 - Scope

This document identifies the minimum required specification for iDTV, STB or type of receivers for digital terrestrial TV broadcasting signals in UAE.

2- Purpose

The purpose of this document is to describe the requirements for a digital terrestrial TV broadcasting receiver .The intention of this document is to also refer to other detailed specifications that need to be adhered to produce a conformant digital terrestrial TV broadcasting receiver. The profile is a hardware specification outline together with software requirements to overview.

3- Receiver Profile

No	Resources	Reference/Detail		Notes
1	Services Summary	The receiver must give access to terrestrial digital services on the particular DVB-T2. This must include the capability to efficiently present TV & radio services, DVB subtitles and Digital Text services. It must present DVB subtitles when broadcast and if requested by the viewer; manage the output video in both widescreen 16:9 and 4:3 picture formats to suit the display.	Req	
2	**Video & Audio**			
2.1	MPEG4 Video	H.264 AVC Decoding MP@L3 HP@L4	Req	ISO/IEC 14496-10 2005 (Information Technology – Coding of audio visual objects – part 10 – Advanced Coding)

2.2	MPEG2 Video	MPEG 2 MP@ML, video resolution, 720x576 (PAL)	Req	ISO/IEC 13818-2
2.3	HDTV Formats	Resolution / Frame Rate/ Scanning / Aspect Ratio		
		1920x1080 / 50 / Progressive / 16:9	Opt	
		1920x1080 / 50 / Progressive / 16:9	Req	
		1920x1080 / 25 / Interlaced / 16:9	Req	
		1280 x720 / 50 / Progressive / 16:9	Req	
		1280 x720 / 25 / Progressive / 16:9	Opt	
2.4	SDTV Formats	Resolution / Frame Rate / Scanning / Aspect Ratio		
		720x576 / 25 / Progressive / 16:9 & 4:3	Opt	
		720x576 / 25 / Interlaced / 16:9 & 4:3	Req	
2.5	Active Format Descriptors	Ability to handle 16:9 widescreen and 4:3 Picture format changes as detailed in the transmission rules including support for correct aspect ratio and Active Format Descriptors.	Req	ETSI TS 101 154
2.6	Audio Decoding	MPEG1 Layer II, audio mode Stereo. Sampling Rate 32, 44.1 & 48KHz	Req	ISO/IEC 11172-3
		Dolby Digital (AC-3) 32, 44.1 & 48KHz – Pass Through Only	Req	ETSI TS 102 366 v1.2.1 Only Pass through of Dolby Digital audio to the Digital Audio Connector is required
		Dolby Digital Plus (E-AC-3) 32, 44.1 & 48KHz – Down-mix to a stereo Pair	Req	ETSI TS 102 366 v1.2.1

		MPEG-4 HE AAC (mono and stereo level 2 bit-streams only)	Req	ISO/IEC 14496-3. Level 2 HE AAC audio for services will be encoded as stereo. It is mandatory for the receiver to decode level 4 multi-channel bit-streams.
2.7	Subtitles	DVB Subtitles. DVB subtitles shall be invoked from a suitable labeled remote control key or any other form of interface shall be provided..	Req	ETSI EN 300 743 V1.3.1 (rev 7 HD amendment)
2.8	Teletext	iDTVs:. The iDTV shall include a Teletext decoder as defined by ETSI standard EN 300 706 Enhanced Teletext Specification including up to Teletext V1.5. A suitable remote control key or any other form of interface must be provided to launch the Teletext OSD display. (Arabic & English)	Req	ETSI EN 300 706
		STBs: Set Top Boxes shall support re-insertion of the teletext data into the VBI of their analogue outputs. Optionally, they may also include a teletext decoder supporting at least teletext level 1.5 (as defined in EN 300 706). (Arabic & English)	Req	ETSI EN 300 706

2.9	Multi-Language Support	The receiver is to at least support the setting of a primary and secondary audio language based on the ISO 639 language descriptors associated with the audio- streams in the ISO/IEC 13818 MPEG2 transport stream.	Req	If the primary language is not Present then the receiver shall automatically select the secondary audio language. When the secondary audio language is also not available then the country default language shall be selected. When the default language is also not available then the receiver may select the first audio primary audio PID appearing in the PMT elementary stream loop.
2.10	Receiver Mixed Audio Description	Receivers that are capable of presenting audio description shall provide at least the minimum user controls. Account should be taken in the design of controls that many users of audio description are visually impaired.	Opt	ETSI TS 101 154 Annex E.
2.11	Broadcast Mixed Audio Description	In addition to the audio language user preferences (See 3.9), receivers shall Provide a user preference to enable broadcast mixed audio description.	Req	

2.12	OSD	Video Layer (a full color layer displaying the output of the MPEG video decoder) Layer to support: □ Y=8 bit, Cb=8 bit, Cr=8 bit □ Chroma to be sub-sampled to either 4:2:0 or 4:2:2 □ Alpha blending need not be supported, but the layer may be shown or hidden. OSD/Graphics Layer (an 8-bit palletised layer which can display region-based graphics) □ Each CLUT palette entry to support: Y=6 bit, Cb=4 bit, Cr=4 bit □ Chroma to be sub-sampled to either 4:2:0 or 4:2:2 □ Alpha blending to be either 6 bit across the entire layer, or 2 bit per pixel The OSD languages that should be supported as minimum are Arabic and English. This should be first setting on powering up the receiver.	Req	Applies to Set-top Box Only.
2.13	Receiver Character Set	The receiver shall support the following character sets: Character code table 00 – Latin Alphabet as specified in IS0 6937. Character code table 02 – Latin Arabic which is compatible with ISO/IEC 8859-6.	Req	ETSI EN 300 468 Annex A
		The receiver shall support display of characters based on the Unicode Bidirectional algorithm.	Req	Unicode standard Annex #9

2.14	Parental Rating	Parental rating descriptor shall follow EN 300 468 v1.13.1 (2012-04) Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems. Mandatory to support all ratings available by DVB.	Req	
3	**Service Information**			
3.1	ESG “Now/Next”	„Now / Next information for use in an on- Screen banner shall be derived using information from DVB SI EITp/f tables as per EN 300 468. The actual appearance of the now/next banner is left to the manufacturer. It is recommended but not mandatory that the following information be displayed in the bottom third of the screen. Current time Start time of now and next programme End time of now and next programme Logical Channel Number Service Name Date	Req	The ESG “Now and next” shall be displayed when the user changes service by default. Normally only “Now” information is displayed by default. Manufacturer are recommended to allow the users to configure the amount of information to be displayed for “Now and Next” at each change.
3.2	ESG ”Schedule”	An EPG application shall be provided using EITschedule information carried in the SI	Req	It is required to support 7 days EPGs. Both “Short event descriptor” and “Extended event descriptor” should be supported.
3.3	TDT / TOT	The receiver shall have a real time clock / Calendar running continuously. The clock shall be updated by the incoming TDT and TOT table in the SI. The time displayed by the receiver shall be the local time.	Req	ETSI EN 300 468

3.4	Network Evolution	The receiver shall support monitor SI in order to automatically detect and suitably handle service changes without the need for user intervention or notified to the user. This includes the following changes - Adding/removing a service - Addition of new multiplex - Change to service name - Change to LCN Changes shall, at least, be processed within 24 hours of the presence of correct SI signaling. It is recommended to update during Standby. This shall be with minimal viewer disturbance.	Req	This may be done, for example, by reference to the SDT and/or NIT version numbers.
3.5	HbbTV	To support a better user experience the receiver should support the HbbTV standards according to ETSI 102 796 v1.2.1). In that case the receiver must also be equipped with an Ethernet interface (RJ-45, supporting 100 Mbit/s).	Opt	
4	**Digital Terrestrial Reception**			

4.1	Receiver Installation	The receiver will perform an automatic linear scan. It shall find all available DVB services irrespective of the network. No duplicated services shall automatically be displayed in the service list. It addition to an automatic search it shall be possible to perform a manual search where suitable tuning information is provided by the user. Any new services found shall be added to the service list.	Req	
4.2	Services Available	After receiver installation all services that may be received shall be available to the viewer. The actual services being broadcast may subsequently change. See section 3.4 and 4.3	Req	
4.3	Scanning for Terrestrial Services	The receiver shall be capable of automatically detecting changes in the services configuration of each broadcast transport stream provided that such changes are implemented by the broadcaster in accordance to the „Transmission rules□ and are compliant with the DVB-SI standards. The intent of this requirement is to allow the broadcaster to vary the services offering within the relevant broadcast transport stream(s) without the viewer needing to rescan the receiver.	Req	ETSI EN 300 468 ETSI TR 101 211.

4.4	Logical Channel Numbers for Terrestrial Services	The receiver shall detect and correctly Process Logical Channel Number (LCN) signaling as defined in the DIGITALEUROPE E-Book. The Private Data Specifier ID (PDS ID) is 0x00000028(DVB_PDSD_EACEM) The receiver shall locate, store and handle services with Logical Channel Numbers	Req	DIGITAL EUROPE E-Book, IEC 62216 ED. 1.0 EN:2009
4.5	Valid Range	The receiver shall locate, store and handle services with Logical Channel Numbers (LCNs) within the valid ranges of 1 to 799.	Opt	The valid range is optional but support of LCNs is mandatory.
4.6	Conflict Range	Any service requesting an LCN outside of the valid range shall be stored in the conflict range. The conflict range shall be defined as 800 – 999. If the conflict range is full, then services shall be back filled from 799 downwards.	Opt	The valid range is optional but support of LCNs is mandatory.
4.7	Own Country services	Services which have an Original Network Id which match the country of installation shall be allocated requested LCN, according to the rules in this specification. Services which do not have an Original Network Id which match the country of installation shall be placed in the conflict range. Refer to Appendix A for Original Nework Id listing on country basis.	Opt	
4.8	Services with Duplicate LCN requests	If multiple services have been allocated the same LCN, then the service with the highest received quality shall be placed in the correct LCN position.	Req	
4.9	Selection via Service List	The service list displayed immediately Following a full automatic scan must present services in ascending LCN order.	Req	

<table>
<tr><td>4.10</td><td>Selection via Numeric Entry</td><td>Selection of a service using numeric entry shall always select a service with that LCN Regardless of any viewer favorites.</td><td>Req</td><td></td></tr>
<tr><td>4.11</td><td>Hidden Services</td><td>Services marked as “hidden” in the LCN Descriptor or where the LCN is zero (0) shall not appear in the service list presented to the viewer.</td><td>Req</td><td></td></tr>
<tr><td>4.12</td><td>RF Input Connector</td><td>IEC 61169-2</td><td>Req</td><td></td></tr>
<tr><td>4.13</td><td>Input Impedance</td><td>75 ohm nominal</td><td>Req</td><td></td></tr>
<tr><td>4.14</td><td>Channel Bandwidth</td><td>UHF: 8 MHz
VHF: 7 MHz</td><td>Req</td><td></td></tr>
<tr><td>4.15</td><td>Tuning Range</td><td>UHF: 470 MHz - 790 MHz
VHF: 174 MHz – 230 MHz</td><td>Req</td><td>Channel Frequencies</td></tr>
<tr><td>4.16</td><td>Service Lists</td><td>The receiver shall maintain at least two service lists, one for television services and one for radio services.</td><td>Opt</td><td></td></tr>
<tr><td>5</td><td colspan="4">DVB-T2 Reception</td></tr>
<tr><td>5.1</td><td>Modulation</td><td>COFDM</td><td>Req</td><td>ETSI EN 302 755</td></tr>
<tr><td>5.2</td><td>Signal Bandwidth</td><td>UHF: 8 MHz
VHF: 7MHz
Including Normal and Extended bandwidth modes</td><td>Req</td><td>The receiver shall not be required to handle 1.7MHz, 5 MHz, 6 MHz or 10 MHz bandwidth signals.</td></tr>
<tr><td>5.3</td><td>Input Signal Level / Receiver Sensitivity</td><td>Required C/N for Picture Failure.
Modulation Parameters / C/N
Carriers: 6913, 8kE
Modulation: 64 QAM
Code Rate: 4/5
Guard Int: 1/32
Pilot Pattern: PP7
FEC Frame: 64800
Frame Len Lf: 244
Data Rate with TR PAPR Used: 34.688
C/N: 18.2</td><td>Req</td><td>These are provisional figures for 8 MHz UHF MFN use. Figures for VHF and for SFNs TBD.</td></tr>
</table>

		Carriers	27841, 32kE	18.8		
		Modulation	256 QAM			
		Code Rate	3/5			
		Guard Int	1/128			
		Pilot Pattern	PP7			
		FEC Frame	68400			
		Frame Len Lf	60			
		Data Rate with TR PAPR Used	36.141			
		Carriers	27841, 32kE			
		Modulation	256 QAM			
		Code Rate	2/3			
		Guard Int	1/128	20.3		
		Pilot Pattern	PP7			
		FEC Frame	68400			
		Frame Len	60			
		Data Rate with TR PAPR Used	40.215			
		Carriers	27265, 32kN	18.8		
		Modulation	256 QAM			
		Code Rate	3/5			
		Guard Int	1/128			
		Pilot Pattern	PP7			
		FEC Frame	68400			
		Frame Len Lf	62			
		Data Rate with TR PAPR Used	35.322			
		Carriers	27265, 32kN	20.3		
		Modulation	256 QAM			
		Code Rate	2/3			
		Guard Int	1/128			
		Pilot Pattern	PP7			
		FEC Frame	68400			
		Frame Len Lf	62			
		Data Rate with TR PAPR Used	39.304			

5.4	Receiver Noise Performance	The tuner noise figure shall be 7 dB or better.	Req	
5.5	Receiver Implementation Margin	2.5 dB or better relative to the AWGN simulations in table 47 of the DVB-T2 implementation guidelines with an additional 0.1dB allowance for BER 10-11 after BCH	Req	This assumes a PP7 pilot pattern. Implementation loss for other pilots is different
5.6	Interference Immunity	TBD	Opt	
5.7	FEFs	Receivers shall not malfunction in the Presence of FEFs. However it is not a requirement to decode them.	Req	
5.8	FFT Size	Receiver shall be capable of detecting and Presenting services transmitted using all DVB-T2 FFT sizes. I.e. 1k, 2k, 4k, 8k, 16k and 32k modes.	Req	
5.9	Constellations	Receiver shall be capable of detecting and Presenting services transmitted using all DVB-T2 modulation constellations, i.e. QPSK, 16-QAM, 64-QAM and 256-QAM.	Req	
5.10	Code Rates	Receiver shall be capable of detecting and presenting services transmitted using all DVB-T2 code rates, i.e. 1/2, 3/5, 2/3, 3/4, 4/5 and 5/6.	Req	
5.11	Guard Interval	Receiver shall be capable of detecting and presenting services transmitted using all DVB-T2 guard intervals. i.e. 1/128, 1/32, 1/16, 19/256, 1/8, 19/128 and 1/4.	Req	
5.12	Pilot Patterns	The receiver shall be capable of the correct reception and decoding of signals utilising the following Pilot Patterns: PP1, PP2, PP3, PP4, PP5, PP6 and PP7	Req	
5.13	Multiple PLPs	The receiver shall be able to receive DVB- T2 transmissions consisting of a single PLP and transmissions consisting of a common PLP together with multiple data PLPs.	Req	ETSI EN 302 755 v1.3.1
5.14	Time Frequency Slicing	The receiver shall not be required to Handle TFS mode.	Req	

5.15	SFN Operation	The receiver correctly operates in the presence of two static echoes (i.e. 2 paths) with a relative delay in a range of 2.0 µs and 0.9 times the duration of the guard interval, independently of the value of the amplitude and of the relative phases. This is assumed to be the minimum requirement for operation in a Single Frequency Network.	Req	The parameters defined in 5.3 above shall be supported.
6	Common Interface			
6.1	Common Interface	A common interface slot and associated Software stack compliant with EN 50221 and TS 101 699 shall be provided. It is strongly recommended that the receiver supports the CI Plus Version 1.3 Specification.	Opt	
7	**Interfaces**			
7.1	For Recording Devices	The receiver may offer output(s) for Connection to a recording device.	Opt	
7.2	HDMI Output	HDMI version 1.4 or greater and shall Support HDCP.	Req	For Set-top Box Only
7.3	Component Video Output		Opt	
7.4	S/PDIF output	S/PDIF for pass through of Dolby Digital (AC-3). IEC 60958-3 Either an optical and/or coaxial outputs.	Opt	
7.5	Analogue Phone Audio Output	RCA Audio left (Color – white) & Right (Color – Red) connectors	Opt	

7.6	Data Interface	The receiver shall have a data interface to perform software upgrades and shall comply to one of the following options;- Universal Serial Bus Host (with support for Mass Storage Device Class) RJ 45 (Ethernet)	Req	
8	**Remote Control**			
8.1	Remote Control	The manufacture is free to design the Remote control. The following remote control keys are required either physically or through other interface	Req	
8.2	Numeric Entry:	□ Keys 0-9	Req	
8.3	Basic TV Functionality:	□ Power turns the receiver on and off □ Programme up/down keys to switch between programs □ Volume up/down keys to adjust the volume output level	Req	
8.4	Digital TV Functions	□ EPG/Guide this key displays an Electronic Programme Guide. □ Back This function exits from the current menu or OSD and returns to the previous state.	Req	
9	**Upgrade**			
9.1	Auto-Upgrade	Receivers shall be capable of software upgrade by Over the Air Download (OAD) with minimal interruption to the viewer and within 24 hours of availability of the download under normal operating conditions.	Req	Over-the-air Download shall use the DVB System Software Update mechanism (DVB-SSU Simple profile) specified in ETSI TS 102 006
10	**User Information**			

10.1	Easy to Use and Simple Documentation	Receivers shall be simple to set up and Operate and be provided with clear easy to understand user documentation in both Arabic and English in line with that requirement.	Req	
10.2	Support Package	The following peripheral items should be included within a baseline DTV package: □ Remote control and batteries □ An easy to understand user manual in both Arabic and English	Req	
10.3	Status	A basic status check shall be available invoked by a menu driven option or a user selected key. The OSD is to present the reception quality, signal strength indicator and Channel ID	Opt	
10.4	Factory Reset	It shall be possible for user to perform a factory reset in order to return device to default settings.	Req	
10.5	Country Selection	During First time installation the user shall be allowed to select each of the following countries of installation: Bahrain Kuwait Oman Qatar Saudi Arabia United Arab Emirates The User shall be allowed change this setting after first time installation, without doing Factory reset.	Opt	
10.6	Model Information	The receiver shall have the following information clearly marked externally and also available in the Software:- -Manufacturer name -Model number	Req	
11	**Conditional Access**			
11.1	Conditional Access System	Receivers shall be capable of supporting subscriber access to services, programs and events (i.e. CAM, Smart Card, etc.).	Opt	

12	**Compliance**			
12.1	DVB-T2	ETSI standards as listed in the relevant Sections of this specification.	Req	ETSI EN 302 755 v1.3.1

Annex A – Original Network ID

The original Network ID is a DVB identifier, which is assigned by DVB on request from the relevant Country. The values below are provisional value until DVB has officially assigned.

Country	Provisional ONID
Bahrain	(TBC) 0x2030
Kuwait	(TBC) 0x219E
Oman	(TBC) 0x2200
Qatar	(TBC) 0x227A
Saudi Arabia	(TBC) 0x22AA
United Arab Emirates	(TBC) 0x2310